

REMARKS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 1-17 remain pending. Claims 8-13 stand withdrawn from further consideration as directed to a non-elected invention.

Claim 19 was rejected under 35 USC 112, second paragraph, as being indefinite. Claims 18 and 19 have been canceled above to advance prosecution. It is therefore respectfully submitted that the Examiner's rejection in this regard has been mooted.

Original claims 1, 3, 7, 14 and 19 were rejected under 35 USC 102(e) as being anticipated by Chen et al. Applicant respectfully traverses this rejection.

At the outset it is respectfully noted that this application is the U.S. National Phase of PCT Application No. PCT/GB00/02571, filed July 5, 2000. As acknowledged by the Examiner on the PTO Form 326 that accompanied the Official Action, a certified copy of the priority document from which PCT application claims priority, GB 9916060.8, as filed on July 8, 1999 has been received from the International Bureau. It is noted that the priority document is in the English language so that no translation thereof is required for applicant to be accorded the benefit of the British priority application. Thus, applicant has taken all required steps to perfect the priority claim and to be entitled to the benefit of the filing date of the British priority application, July 8, 1999.

The Chen patent cited by the Examiner was first filed on November 22, 1999. As such, Chen is not statutory prior art under 35 USC 102(e) because it was not filed in the United States before the invention (e.g., priority date) by applicant. It is therefore respectfully submitted that the rejection based on Chen et al must be withdrawn.

It is further respectfully submitted that the invention of claims 1, 5, 7 and 14 is patentably distinct from Chen.

The invention of claim 1 relates to a method of producing a mask for use in producing a resist pattern for etching a printed circuit. While Chen is concerned with mask production, in contrast to the invention, Chen relates to a photo mask to be used in lithographic production of features within a semi-conductor chip, as is clear from column 1, lines 11-13: "various conducting lines and other features found within a semi-conductor chip are created by lithographic means." The lithographic production of components within a semi-conductor chip is not the same as the production of a printed circuit.

Anticipation under Section 102 of the Patent Act requires that a prior art reference disclose every claim element of the claimed invention. See, e.g., Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1574 (Fed. Cir. 1986). While other references may be used to interpret an allegedly anticipating reference, anticipation must be found in a single reference. See, e.g., Studiengesellschaft Kohle, G.m.b.H. v. Dart Indus., Inc., 726 F.2d 724, 726-27 (Fed. Cir. 1984). The absence of any element of the claim from the cited reference negates anticipation. See, e.g., Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 715 (Fed. Cir. 1984). Anticipation is not shown even if the differences between the claims and the prior art reference are insubstantial and the missing elements could be supplied by the knowledge of one skilled in the art. See, e.g., Structural Rubber Prods., 749 F.2d at 716-17.

Because the lithographic production disclosed in Chen is not the same as and does not anticipate the claimed production of a printed circuit, it is respectfully submitted that the invention would not be in any event anticipated by nor obvious from Chen. Indeed, both claims 1 and 14 of the present application are method claims, more specifically methods in the production of a printed circuit, so that these claims are limited to printed circuit technology and do not cover and are not anticipated by semi-conductor lithography. Furthermore, the techniques and technology used in semi-conductor lithography are quite different from the techniques used in production of a printed circuit. Printed circuits, usually in the form of copper on an insulating substrate,

are familiar to all those of skill in the art. They are quite different from the production of circuits within a semi-conductor. Thus, it is respectfully submitted that the skilled artisan, faced with a technical problem in the production of printed circuits (with which the present invention is concerned) would not be motivated to refer to semi-conductor chip lithography techniques nor adopt such techniques.

Moreover, according to the invention as defined in amended claim 1 and in claim 14, the conductor elements in the pattern must have a constant width etch band delineating them. With a conventional printed circuit board, some areas where the conductors are very closely spaced require less copper to be etched away than areas where there are few conductors. However, the difference in the amount of conductor which needs to be etched away causes variations in etch rate. This problem has been eliminated by the constant width etch band provided according to the invention. More particularly, with the present invention, because the amount of local conductor which has to be etched away is constant (because it consists of a constant width etch band delineating the conductors), the etch rate is the same over the entire pattern. Advantageously, then, the width of the conductors which are produced is relatively constant and problems of undue narrowing of conductors, undercutting of conductors by etchant, and the breaking of conductors are reduced. Thus, in the manufacture of high-resolution printed circuits, the invention requires and is limited to a constant etch band around each conductor in the photo resist stencil so that there is a uniform etch rate of the conductor layer, irrespective of conductor width.

In contrast to the invention, in Chen, a single "moat" is formed around the entire internal circuit area. The individual elements within the circuits do not have any form of etch band or moat feature around them. Because there is a single moat around the entire area, Chen does not teach that individual elements in the pattern should have a constant width etch band around them. It is thus the constant width etch band delineating each of the individual conductors that most clearly distinguishes the invention from the applied art by allowing the invention to achieve a very high resolution and small conductor width. Applicant submits that the printed circuits

produced by the applicant using the present invention currently have the finest resolution of any available anywhere in the world.

It is further respectfully noted that the moat described in Chen is in fact 10mm wide. This is clear from column 6, lines 46 and 47 which say: "A moat width of 10 mm was sufficient to deliver the desired CD improvement on a clear field mask." The teaching of Chen is, in fact, that the moat should be of a width corresponding to the diffusion length of the active species. This is always on the order of several millimeters and does not bear any relation to the dimension of the narrowest conductor. Thus, the concept behind the moat in Chen is quite different from the concept of the present invention. The provision of a moat of the type taught in Chen would of course not allow a fine printed circuit resolution which is required by and provided for by the present invention.

In summary, then, in terms of technology, Chen is concerned with semi-conductor lithography, not with the production of printed circuit boards. Thus, Chen is not relevant to the invention claimed and would not motivate the skilled artisan to modify the record prior art to produce the invention. Furthermore, Chen teaches a moat around an entire circuit pattern, not an etch band delineating individual circuit elements in a printed circuit. The moat of Chen is of considerably different dimensions than an exemplary embodiment of the invention and thus does not provide the requisite teaching for the skilled artisan to arrive at the claimed invention.

For all the reasons advanced above, reconsideration and withdrawal of the rejection based on Chen is solicited.

Claims 2, 4-6 and 15-17 were rejected under 35 USC 103(a) as unpatentable over Chen. As noted above, Chen is not statutory prior art with respect to the present invention and, therefore, the rejection based on Chen should be withdrawn. It is further respectfully submitted that Chen does not render obvious the subject matter of the noted claims. In this regard, it is respectfully submitted that the comments made by the Examiner as to the smallest achievable feature size in Chen is not relevant to the


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invention of the claims the Examiner has identified because, as explained above, the moat feature of Chen is many times the size of the etch band as may be provided in an embodiment of the invention. While the features within the inner circuit area 401 of Chen may be small, Chen does not indicate that his disclosed moat should be of comparable dimensions. On the contrary the moat is taught by Chen as a larger area which simply surrounds the entirety of the inner circuit area. Therefore, the noted claims are not obvious from Chen either.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

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